

REMARKS

Applicants thank the Examiner for acknowledging the claim for priority under 35 U.S.C. § 119, and receipt of a certified copy of the priority document submitted October 23, 2001.

Applicants thank the Examiner for considering the reference cited with the Information Disclosure Statement filed October 23, 2001.

Applicants thank the Examiner for acknowledging the election without traverse of Embodiment II, claims 1-4, 6 and 9-13 in the Response to Restriction Requirement filed February 25, 2003.

Status of the Application

Claims 1-4, 6 and 9-20 are all the claims pending in the Application, as claims 14-20 are hereby added to more fully define the invention, and claims 5, 7 and 8 are withdrawn from consideration in view of the above election. Claims 1-4, 6 and 9-13 have been rejected.

Specification Objection

The Examiner has objected to the Abstract for containing more than 150 words. The abstract is hereby amended to correct this informality. Thus, Applicants respectfully request that the Examiner withdraw this objection.

Indefiniteness Rejection of Claim 9 Under 35 U.S.C. § 112, Second Paragraph

The Examiner has rejected claim 9 as being indefinite under 35 U.S.C. § 112, second paragraph. Applicants respectfully submit that the informalities noted by the Examiner are corrected by amendment herein. Thus, withdrawal of this rejection is respectfully requested

Obviousness Rejections of Claims 1-4, 10, 12 and 13 Under 35 U.S.C. § 103(a)

The Examiner has rejected claims 1-4, 10, 12 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Hayakawa et al. (US 4,478,595; hereinafter “Hayakawa”) in view of Bartos et al. (US 4,758,208; hereinafter “Bartos”). This rejection is respectfully traversed.

Hayakawa

Hayakawa discloses “a belt tensioner for use in automotive vehicles for automatically tensioning an endless belt of the drive system for such vehicle accessories as a water pump, a power steering pump, an alternator, and the like.” (See col. 1, lines 7-12).

Specifically, (see FIG. 2) Hayakawa discloses an engine 3 with an endless belt 2 wound around pulleys 4-8, respectively connected to a crankshaft, an alternator 5a, a power steering pump, a refrigerant compressor, and a water pump. (See col. 3, lines 32-61). Belt tensioner 1 is provided to control the tension of belt 2, is located between pulleys 6 and 7, and is controlled by electric control apparatus 9. (See col. 3, lines 62-65).

Belt tensioner 1 interacts with belt 2 through idler pulley 20 (see FIG. 3). Idler pulley 20 is vertically positioned when stepper motor 31 operates to rotate screw shaft 34 on bearings 33. This rotation of shaft 34’s screwed portion 34a causes the vertical translation of movable member 30. Pulley 20 is mounted on piston rods 26, which are in turn connected to movable member 30 via compression spring 36. (See col. 3, line 65 - col. 4, line 39). Compression spring 36 helps to keep idler pulley 20 in contact with belt 2. (See col. 4, lines 26-29).

The operation of belt tensioner 1 (and thus the position of idler pulley 20) is controlled by electric control apparatus 9, which is connected to pressure sensor 11, ammeter 12, ammeter 10, speed sensor 13 and displacement sensor 38 to optimize the tension of belt 2 (See col. 4, lines

40-65). When the automobile is turned on (but prior to engine start), electric control apparatus moves idler pulley 20 to provide an initial tensioning force T_i , in order to provide the minimum drive torque necessary for driving the vehicle accessories without any slippage of belt 2 on pulleys 4-8. (See col. 6, lines 12-16). The tension of belt 2 initially remains at T_i after engine 3 is started.

Then, electric control apparatus determines an optimal tension T_R for belt 2, based on inputs from the sensors listed above. T_R varies, but is based on the need for increased tension to operate engine accessories, which is illustrated in FIG. 9 as the requirement for increased tension related to increased drive torque M .

Bartos

Bartos discloses a vehicle belt tensioning system for use with a combined vehicle starter-generator, or "stargen." (See col. 1, lines 5-15). Bartos discloses that the use of a stargen has been desired in order to reduce the amount of engine components, but that use was not widespread due to belt tensioning problems because of the opposite belt slack sides produced by the stargen in starter mode and generator mode.

Bartos seeks to eliminate this problem by mounting stargen 10 so that it is able to be rotated about its central shaft 12 between two positions (see FIGS. 1 and 2) defined by pin 24 and slot 26. This rotation is caused by reaction torque (in opposite directions) created by stargen 10 in generating mode (FIG. 1) and starting mode (FIG. 2). These two positions result in the switch of the tight and slack sides of belt 18 between $18'$ and $18''$, respectively. (Col. 2, line 65 - col. 3, line 16).

The Examiner's Position

Regarding claim 1, the Examiner has taken the position that Hayakawa discloses all of the recited features, except that it “does not disclose said electric machine pulley being a generator.” (See Office Action, pg. 3).¹

The Examiner then attempts to show such a feature by applying Bartos, taking the position that Bartos discloses “an automatic belt tensioner for a combined starter generator mounted on a vehicle.” The Examiner proffers that it would have been obvious to modify Hayakawa in view of Bartos “to provide a single rotating electric machine pulley within said belt transmission apparatus to eliminate the need for two components.”

No Combination of the Applied References Teaches or Suggests all Claimed Features

In contrast to the Examiner's position above, Applicants respectfully submit that, even if Hayakawa and Bartos could somehow have been combined, the resultant combination would still fail to teach or suggest many of the features recited in the rejected claims.

Regarding claim 1, Applicants respectfully submit that, even if alternator 5a of Hayakawa could be replaced by stargen 10 of Bartos, there is still no teaching or suggestion of a tension adjuster that sets a belt tension “greater when said engine is started by said rotating electric machine than when said accessory is driven to operate after said engine has been started.”

Hayakawa discloses that, prior to engine start, an initial tension T_i is set in belt 2. After engine start, Hayakawa discloses that optimal tension T_R is maintained. There is no teaching or

¹ Applicants also disagree with the Examiner as to his reading of the disclosure of Hayakawa. Applicants respectfully submit (as discussed below) that Hayakawa fails to teach or suggest any portion that could be read as “a rotating electric machine for transmitting starting power to an engine” (claim 1) or that the “rotating electric machine comprises a starter motor” (claim 12).

suggestion that initial tension T_i is ever higher than optimal tension T_R . In fact, Hayakawa discloses that tension should be increased to operate engine accessories. Thus, Hayakawa discloses that T_R should always be greater than T_i .

Bartos also fails to teach or suggest that the tension in belt 18 is higher during engine start than when the engine is running. In fact, Bartos merely discloses a change in the point of application of tension, based upon the status of stargen as a starter or a generator. There is simply no teaching or suggestion that the magnitude of that tension is modified in any way.

Thus, Applicants respectfully request that the Examiner withdraw this rejection. Additionally, Applicants respectfully submit that rejected claims 2, 3, 4, 10, 12 and 13 are allowable, *at least* by virtue of their dependency from claim 1. Further, Applicants respectfully submit that *at least* the following claims are separately patentable over the applied references.

Regarding claim 2, Applicants respectfully submit that the combination of Hayakawa and Bartos also fails to teach or suggest any tension adjuster “disposed in an area in which a slack of said belt occurring when said engine is started by said rotating electric machine becomes the greatest.”

Specifically, Hayakawa discloses that belt tensioner 1 is provided between pulleys 6 and 7. Thus, even if Hayakawa could somehow have been modified to provide the stargen of Bartos in place of alternator 5, the portion of belt 2 with the greatest amount of slack would be the portions adjacent to the stargen, *i.e.*, between alternator 5 and either pulleys 4 or 6 in Hayakawa, dependent upon the direction of rotation of belt 2. It is clear that belt tensioner 1 is not provided in either of these locations, and therefore the resultant combination could not provide the claimed feature. Thus, Applicants respectfully request the withdrawal of this rejection.

Obviousness Rejections of Claims 6 and 9 Under 35 U.S.C. § 103(a)

The Examiner has rejected claims 6 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Hayakawa in view of Trzmeil et al. (US 5,606,941; hereinafter “Trzmeil”). This rejection is respectfully traversed.

Hayakawa is discussed above. Trzmeil discloses “a device for tightening and adjusting a wind-around drive constructed as a chain by means of which a camshaft of an internal combustion engine drives a second camshaft.” (See col. 1, lines 8-10). Specifically (see FIG. 1), camshafts 1 and 2 are connected via chain 3. The tension of chain 3 is modified via the vertical movement of pistons 14, 15, which are disposed within tightening device 5, and contact chain 3 via sliding blocks 10, 11. The vertical movements of pistons 14, 15 are controlled by electrically operated lifting magnet 56, which vertically moves piston rod 44 to allow the communication of fluid from pressure sites 51, 52, 55 and the draining of fluid from portions 52, 54.

The Examiner takes the position that Hayakawa discloses all of the features of claims 6 and 9, except for the “elastic deformation unit comprising an electromagnetic coil, a spool, a cylindrical housing, and a piston.” (See Office Action, pg. 4). In an attempt to provide such features, the Examiner applies Trzmiel, taking the position that it would have been obvious to provide the Trzmeil device “instead of a mechanical gear system to achieve more precise position of said push rod.” (See Office Action, pg. 4).

However, Applicants respectfully submit that there would have been no motivation to modify Hayakawa in view of Trzmeil. The Examiner’s professed reason, to make the positioning of the push rod more precise, is unsupported by any of the references. The Examiner has not explained how the hydraulic system of Trzmeil would be in any way more precise than

electrically based system of Hayakawa. Further, the system of Trzmeil is significantly more complicated than that shown in Hayakawa. The Examiner has failed to identify any particular reason why one of skill would have sought to provide a more complicated adjustment system in Hayakawa.

Further, even if it were possible to modify Hayakawa in view of Trzmeil, Applicants respectfully submit that the resultant combination would still fail to teach or suggest all of the elements of claims 6 and 9. Specifically, the neither Hayakawa or Trzmeil teach or suggest “a rotating electric machine pulley of a rotating electric machine for transmitting starting power to an engine,” as recited in claim 1 (from which claims 6 and 9 depend). No feature of Hayakawa teaches or suggests that any of the pulleys 4-8 are connected to any machine capable of transmitting starting power to engine 3. Trzmeil is equally silent on any such feature, as it is directed towards camshaft chains.

Thus, Applicants respectfully request that the Examiner withdraw this rejection.

Obviousness Rejections of Claim 11 Under 35 U.S.C. § 103(a)

The Examiner has rejected claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Hayakawa in view of Foster et al. (US 4,454,236; hereinafter “Foster”). This rejection is respectfully traversed.

Hayakawa is discussed above. Foster discloses tensioner 22 for maintaining tension on belt 21, which is connected to pulleys mounted on crankshaft 23, power steering pump 24, compressor 30, alternator 28 and air pump 26. When the engine in Foster is started, tensioner 22 is fixed in place, as shown in FIG. 3, in order to provide tension in belt 21. After then engine is shut off (FIG. 4), and the system cools suitably, stem 90 is extended to release pawls 82 from

toothed wheel 77, thereby allowing bracket 53 and idler pulley 36 to be urged against belt 21 by way of torsion spring 65. This operation provides a retensioning of belt 21 that may have been introduced due to wear or stretch. (See col. 7, lines 12-57). The fixing of bracket 53 in place (FIG. 3) results from a signal from electrical system 101, "before the automobile engine 20 is actually started and hence is achieved immediately prior to moving the driving sheave 23." (Col. 6, lines 29-32).

The Examiner takes the position that all of the features of claim 11 are disclosed by Hayakawa, except that the position of the push rod is "based on an engine starting signal." Thus, the Examiner applies Foster in an attempt to show such a feature, alleging that Foster discloses "a belt tensioner which adjusts the tension within a belt entrained on pulleys of a vehicle based on an engine starting signal 100, 101. The Examiner proffers that it would have been obvious to modify Hayakawa in view of Foster, to "adjust the positioning of the push rod so as to provide proper tensioning of said belt when said belt is in a starting mode."

In contrast, Applicants respectfully submit that there would have been no motivation for one to modify Hayakawa in view of Foster. Specifically, the system of Hayakawa is provided to adjust the tension on a belt during operation of the engine, to ensure optimal tension. In contrast, the system of Foster is provided to adjust the tension of a belt when the engine is not running. Thus, the systems have directly opposite goals, and the Examiner has not explained how one would have modified Hayakawa to include the features of Foster.

Further, even if one were able to modify Hayakawa in view of Foster, Applicants respectfully submit that the resultant combination would still fail to teach or suggest all of the elements of claim 11. Specifically, neither Hayakawa nor Foster teach or suggest any control of

a push rod by a central processing unit processing a vehicle speed.” In an attempt to show such a teaching, the Examiner has alleged that Hayakawa discloses that the position of a push rod is based upon the RPM of an engine, which inherently includes a vehicle’s speed. (See Office Action, pg. 3). However, it is an incorrect proposition to assume that there is any inherent relationship between the RPM of an engine and a vehicle speed, *i.e.*, it is not necessarily true that an engine turning a higher RPM would produce a greater vehicle speed.

Further, neither Hayakawa or Foster teach or suggest “a rotating electric machine pulley of a rotating electric machine for transmitting starting power to an engine,” as recited in claim 1 (from which claim 11 depends). No feature of Hayakawa teaches or suggests that any of the pulleys 4-8 are connected to any machine capable of transmitting starting power to engine 3. Similarly, none of the devices 23, 24, 30, 28 or 26 in Foster are capable of providing starting power to Foster’s engine.

Thus, Applicants respectfully request that the Examiner withdraw this rejection.

New Claims

Applicants hereby add new claims 14-20, to more fully define the invention. Applicants respectfully submit that claims 14-20 are fully supported at least by FIGS. 1, 2 and 5 of the Application, and are patentable over the applied references for many of the same reasons discussed above.

Conclusion

In view of the foregoing, it is respectfully submitted that claims 1-20 are allowable. Thus, it is respectfully submitted that the application now is in condition for allowance with all of the claims 1-20.

Amendment Under 37 C.F.R. § 1.111
U.S. Appln. No.: 09/983,090

Attorney Docket # Q66650

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Please charge any fees which may be required to maintain the pendency of this application, except for the Issue Fee, to our Deposit Account No. 19-4880.

Respectfully submitted,



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